WeBee

BLE SPS Module User Manual **V1.1**

2014.6

Revision History

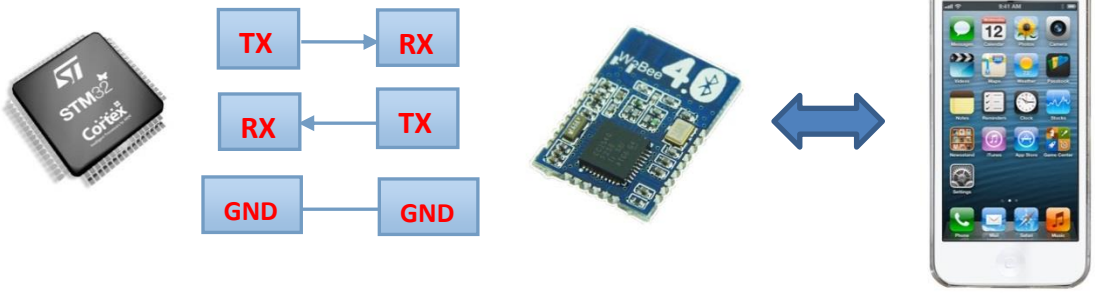
Sequence	Revision	Date	Contributors	Comments
1	V1.0	2014-4-25	Jackey Yao	Release First
2	V1.1	2014-5-12	Jackey Yao	Add iOS APP

Catalog

1 Overview 4
2 Module Package 6
3 Factory settings 6
4 Data transmit and Command Set 7
5 The format of command setting 8
5.1 Switch to the Slave(Peripheral) role 8
5.2 Switch to the Master(Central)role 8
5.3 Modify the baud rate 8
5.4 Set the address of the target module 8
5.5 Set the advertising interval value 9
5.6 Set connection parameters 9
5.7 Set the module name 10
6 View Parameters command 10
6.1 View Current role of module 10
6.2 View the Baud Rate of Module 10
6.3 View the target module BT address 11
6.4 View the BT address of the module 11
6.5 View the name of module 11
6.6 View the advertising interval value of module 11
6.7 View the connection parameters. 11
7 Program Example 12
8 Test Tool 12
8.1 PC software test tool 12
8.1 Test the Data Passthrough Between module and module. 16
8.2 Test Data Passthrough in Smartphone 17
8.2.1 Use “LightBlue” APP for Testing. 17
8.2.2 Use the APP testing that WeBee provide(ios7.0 above) 25

1 Overview

BLE SPS



* Transmit data by BLE
* Can communication with most of MCU UART in 3.3v level
* Android/IOS/PC Connected by BLE

Description：

The BLE module is designed with TI CC2540/CC2541 that is a Bluetooth low energy chip which is compliant Bluetooth 4.0 single-mode. It is mainly used in low-power sensor networks and short-range wireless communication. The basic function of WB-BLE-001 is to transmit data between WB-BLE-001 module and WB-BLE-001 module or WB-BLE-001 module and smart phone.

WB-BLE-001 integrates with the "AT" command set. So the module can set in master role or slave role, the name of the module can be modified, the baud rate, advertising interval value and the connection parameters can be modified by users.

Feature：

- **Small size2.2*1.5 cm**
- **Long communication distance　Smart phone to Module：60meters；Module to Module :100meters（In open environment）**
- **Optimize the BLE stack in depth，Works Power Consumption:60 ~ 800uA；**
- **Master and slave can be switch**
- **A serial port for sending interval　<10ms**
- **Respond time from sleep less than 0.4S**
- **Transmit speed 3~5Kb/s**
- **Integrate AT command set**
- **Support Android 4.3 、IOS、PC**
- **No need MFI**

WeBee Provide：

- **PC software for Modify and view the relate parameters**
- **APP Test Software**
- **Professional technical guidance**
- **Support enterprise, individual additional customization**

2 Module Package

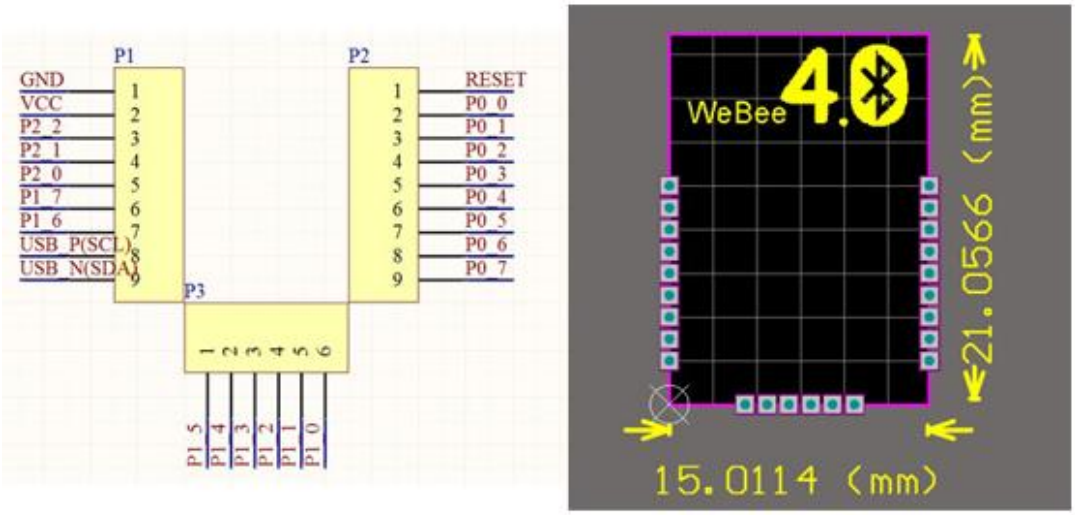


Figure 2.1 Module Package

3 Factory settings

Item	
Module	Slave (Peripheral) role
Module name	"BLE SPS"
Module Baud Rate	115200bps，Data filed 8bit，stop bit 1bit，No odd-even check

4 Data transmit and Command Set

The pin that the module used are as follow:

Pin	IO	Use	Comment
VDD	--	VDD	
GND	--	GND	
P0_2	**RX0**	**The Rx Pin of Module**	
P0_3	**TX0**	**The Tx pin of Module**	
P0_0	I（Input）	Sleep/wake up	
P0_1	I（Input）	Data/Command	
P1_0	0（Output）	Connection status	High Level :Connection LowLeve :Disconnection
P0_4	I（Input）	Store factory setting	Pull down the pin more than 2 second

Pin / Mode	P0_0	P0_1
Sleep	**0**	**X**
Data Transmit Mode	**1**	**1**
Command Mode	**1**	**0**

When the pin P0_0 pull up as high level and at this time the pin P0_1 also pull up as high level, then the module works in transmit data mode.

When the pin P0_0 pull up as high level and at this time the pin P0_1 pull down as low level, then the module works in command setting mode.

When both P0_0 and P0_1 are pulled down as low level, then the module works in sleep mode.

Note:

1. **Pin P0_0 can be connected to a pull-up resistor to 3.3V, if the Users don't need the sleep mode.**
2. **Pin P0_1 can be connected to a pull-up resistor to 3.3v, if the Users don't need the command setting mode.**
3. **WeBee can help custom to modify the firmware for the special application.**

5 The format of command setting

All the command format is consist of ”FA+type+data length+data+AA”, the head of the command frame is FA, type is the command type, data length is the length of user data in this frame, AA is the finish symbol of the command frame.

5.1 Switch to the Slave(Peripheral) role

The default role of module is slave role. As slave role, it can communication with the smart phone and also the master role module.

The command is: FA 00 00 AA

If executed successful, the module will return “Set Peripheral Role OK\n” immediately. Otherwise it means it set failed.

5.2 Switch to the Master(Central)role

As the master role, the module only communicates with the slave module.

The command is: FA 01 00 AA

If executed successful, the module will return “Set Central role OK\n” immediately. Otherwise it means it set failed.

5.3 Modify the baud rate

The module can compatible with a variety of baud rate.

The command to set the baud rate is: FA 02 01 Baudrate AA

Baudrate	Baud Rate	Command
00	9600bps	FA 02 01 00 AA
01	19200bps	FA 02 01 01 AA
02	38400bps	FA 02 01 02 AA
03	57600bps	FA 02 01 03 AA
04	115200bps	FA 02 01 04 AA

If executed successful, the module will return “Set the BaudRate OK\n” immediately. Otherwise it means it set failed.

5.4 Set the address of the target module

When the module is in master role, it is need to set the master module connect

which slave module.

The command is: **FA 03 06 XX XX XX XX XX XX AA；**

“XX XX XX XX XX XX” This 6 bytes is the target slave module address.

If executed successful, the module will return "Set target address ok\n" immediately. Otherwise it means it set failed.

Note: When the target slave module address is set as “00 00 00 00 00 00”, it means the master will connect the target slave module which the master first scanned. The factory setting is the “00 00 00 00 00 00”.

5.5 Set the advertising interval value

When the module is slave role, it may need to set the advertising interval value.

The command is: **FA 04 length interval AA**

For example if want to set advertising interval value in 500ms, so the 500/0.625=800.

Then turns the 800 into Hexadecimal: 800(d) = 320(h)

Then 320 is the 03 and 20, so the Command is FA 04 02 03 20 AA.

If executed successful, the module will return "Set Advertising interval OK\n" immediately. Otherwise it means it set failed.

5.6 Set connection parameters

The connection parameters influence the data transmit speed and the power consumption.

The command is: **FA 05 08 conn_min conn_max latency timeout AA**

There are 4 variables, every variable is 2 bytes.

For example if the conn_min set as 6,

conn_max set as 150

latency set as 0

timeout set as 300

Then the final command is : FA 05 08 00 06 00 96 00 00 01 2C AA

If executed successful, the module will return "Set Connection Interval OK\n" immediately. Otherwise it means it set failed.

Note: The small of the connection interval, the speed is faster and the power consumption is higher.

conn_min and conn_max **(In 1.25 ms unit, range: 7.5 ms to 4 s (0x0006 - 0x0C80))**

Latency **(Range 0-499)**

Timeout **(In 10ms unit， Range: 100ms to 32 seconds (0x000a - 0x0c80).)**

5.7 Set the module name

When the module in slave role, use the following command can set the advertising name.
Command: FA 06 name_length name AA
For example the name of module is set in ”123”,then the command is FA 06 03 31 32 33 AA
If executed successful, the module will return "Set Name OK\n"immediately. Otherwise it means it set failed.
Note: The length of module name less than 21 bytes.

6 View Parameters command

WB-BLE-001 module provides the interface to view the module parameters. The current role of the module, baud rate of the module, advertising interval value of module, connection interval value of module and the name of the module can be viewed.
The view command format is: ”FB+type+00+AA”

6.1 View Current role of module

View the current role of the module, the command is following:
FB 00 00 AA
If executed successful, the UART of the module will return as follow:
When module is Peripheral role: print “ Peripheral Role”
When module is Central role: print “Central Role”.

6.2 View the Baud Rate of Module

View the Baud Rate of the module, the follow command is provided:
FB 01 00 AA
If executed successful, the UART of module will print: "Baudrate is: 9600", that meas the baud rate of module is 9600bps.

6.3 View the target module BT address

When the module is in central role, it can be view the BT address of target module that the central module will connect. The command is as follow:
FB 02 00 AA
If execute successful, the UART of module will print:Target Address:xxxxxxxxxxxx，xxxxxxxxxxxx is the target peripheral BT address.

6.4 View the BT address of the module

Every module has itself BT address, the following command can get the local module BT address:
FB 03 00 AA
If execute successful, the UART of module will print: Local Address:xxxxxxxxxxxx

6.5 View the name of module

The name of module can be got by smart phone when the module is in peripheral role. Also can be got by UART. The following command can get:
FB 04 00 AA
the UART of module will print the name of the modle.

6.6 View the advertising interval value of module

Using the following command can get the advertising interval value of module:
FB 05 00 AA,
If execute successful, the UART of module will print the advertising interval value.

6.7 View the connection parameters.

The following command can get the connection parameters:
FB 06 00 AA
If execute successful, the UART of module will print the connection parameters.

7 Program Example

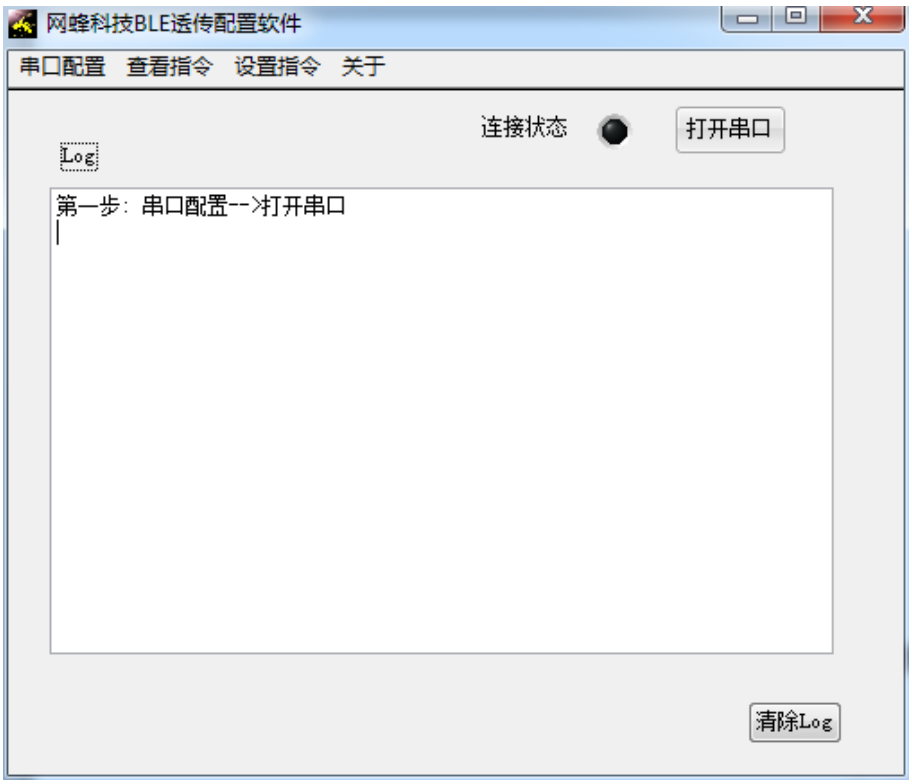
The external MCU sends the data to the module, the external MCU firstly must pull up the P0_0 pin the module in order in wake up the module. When finish sending data, the external MCU must bt pull down the P0_0 pin of the module.

```
Void sendDataViaBt(unint8 *buf,uint8 len)
{
   P0_0=1    //Wake uk
   Delay_10us();

   Uart_send(buf,len);
   Delay_1ms();

   P0_0=0;    //Make the module into sleep for saving power
}
```

8 Test Tool

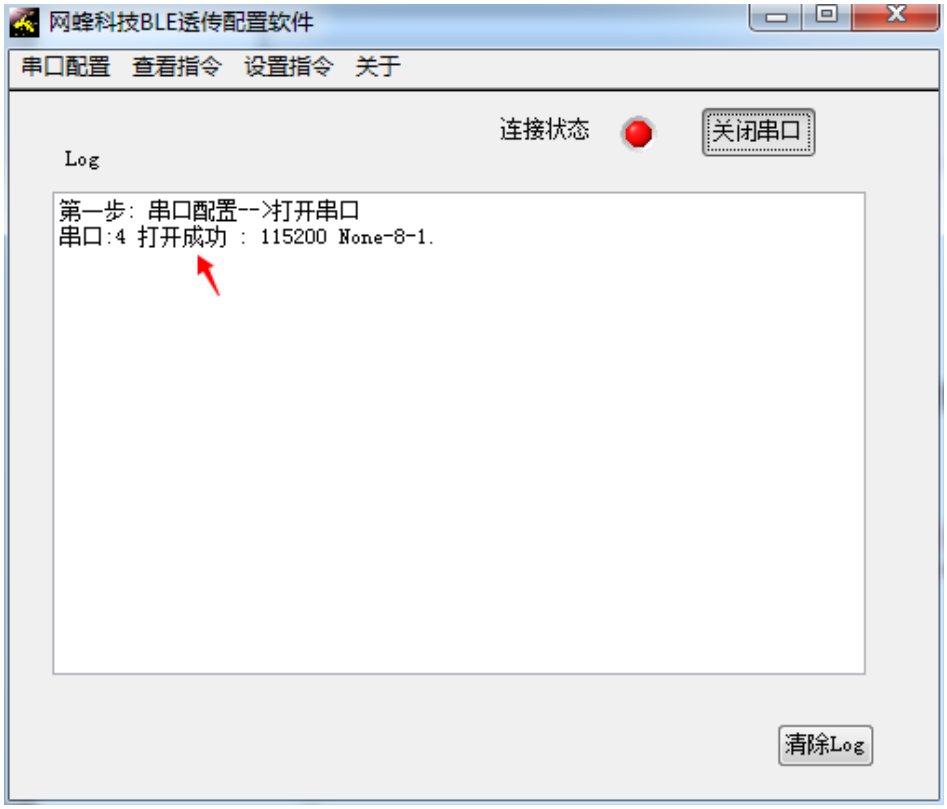
8.1 PC software test tool

1. After installed the PC BLE software, the following picture will show.



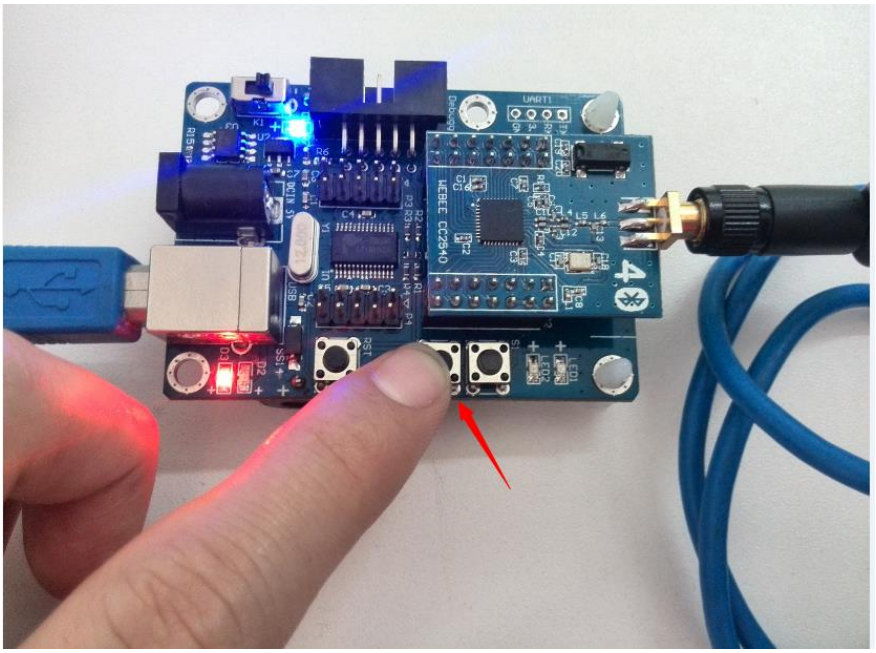
2. Click the “Serial Configure” and input the baud rate value

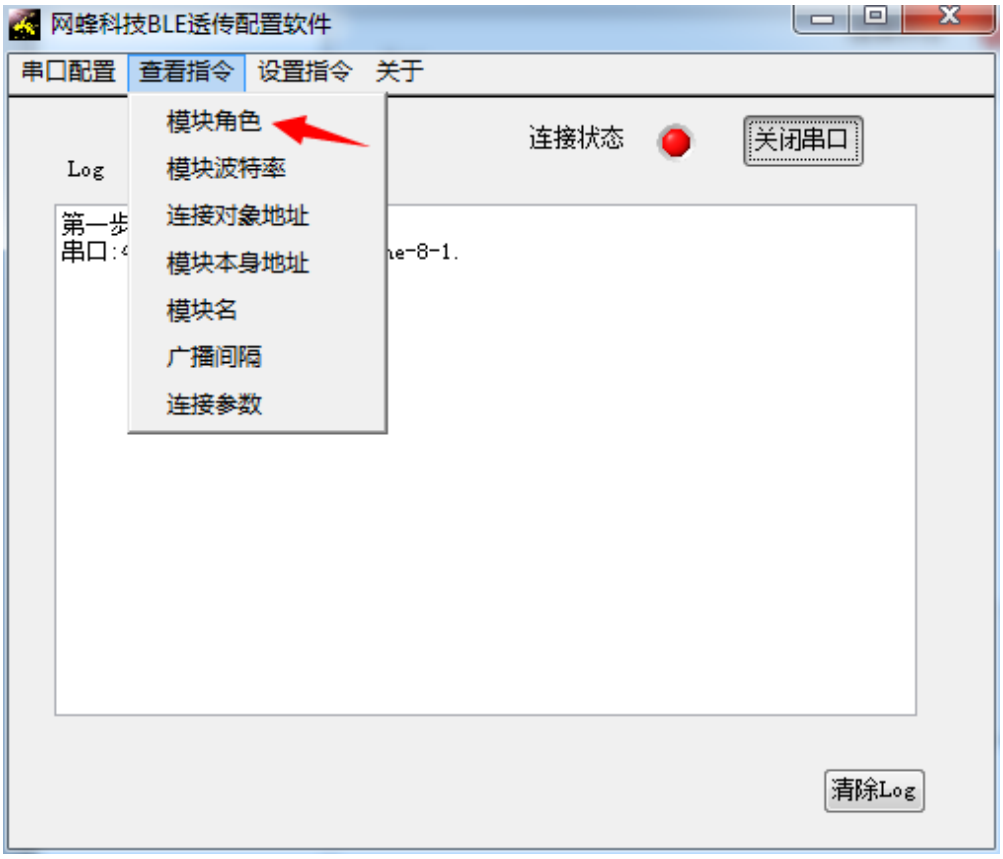
3. Click the “OK” to open the UART of PC.



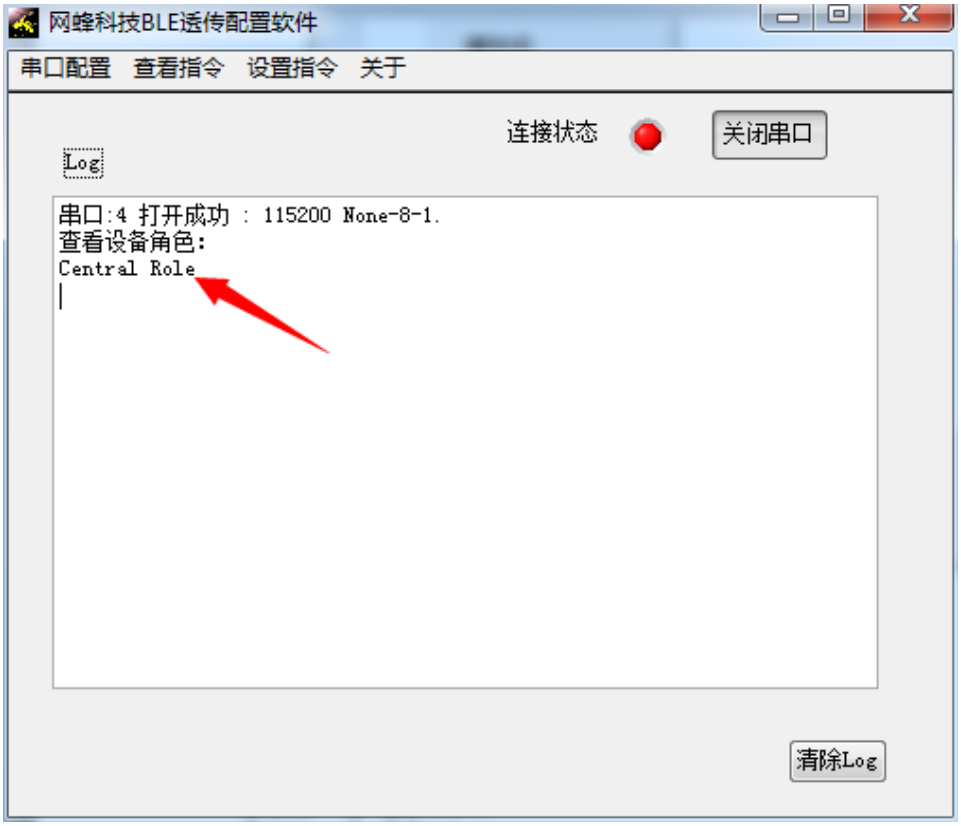
4. Here provide “View the module role” for example. Other test, the users can do by yourself.

From the Part4, If send the command to the module must Pull Down the P1_0 pin. If uses WeBee Board, Pressed the S2 Key and click the “Module role” in the “View Command set”.





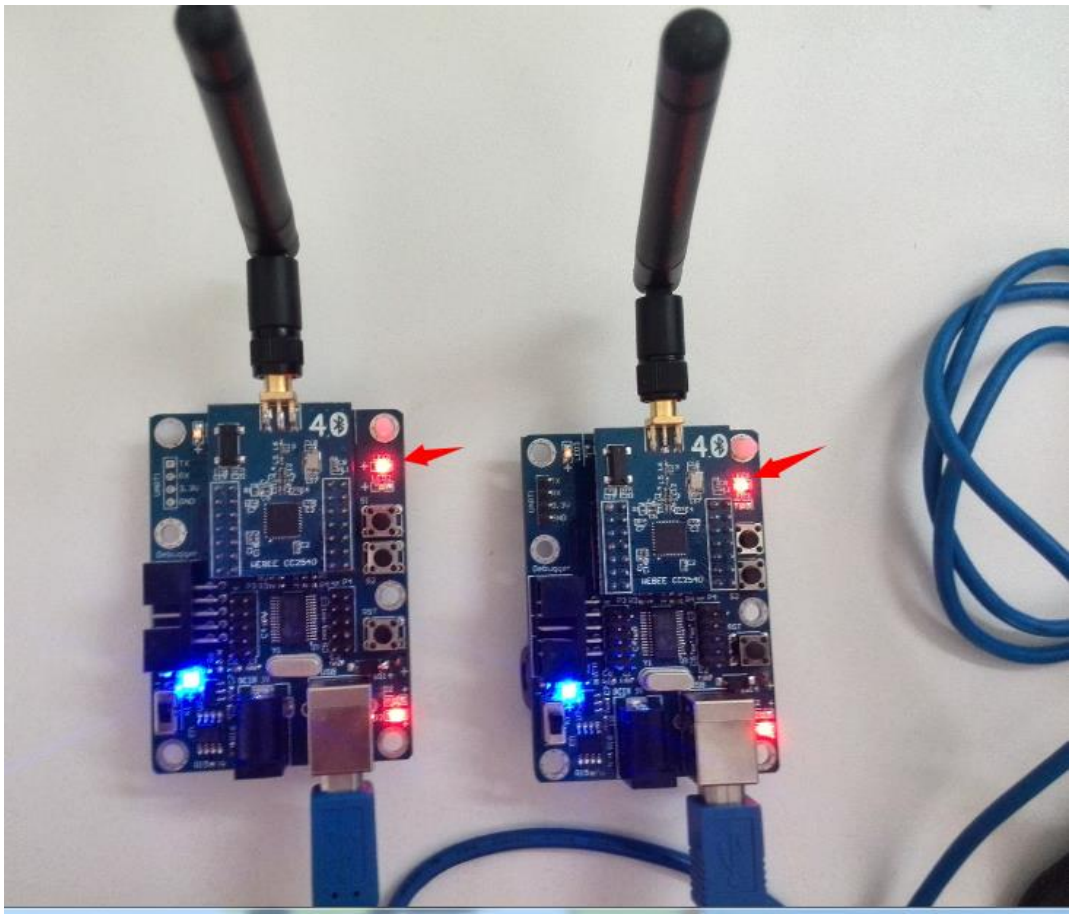
It shows the current role is “Central”



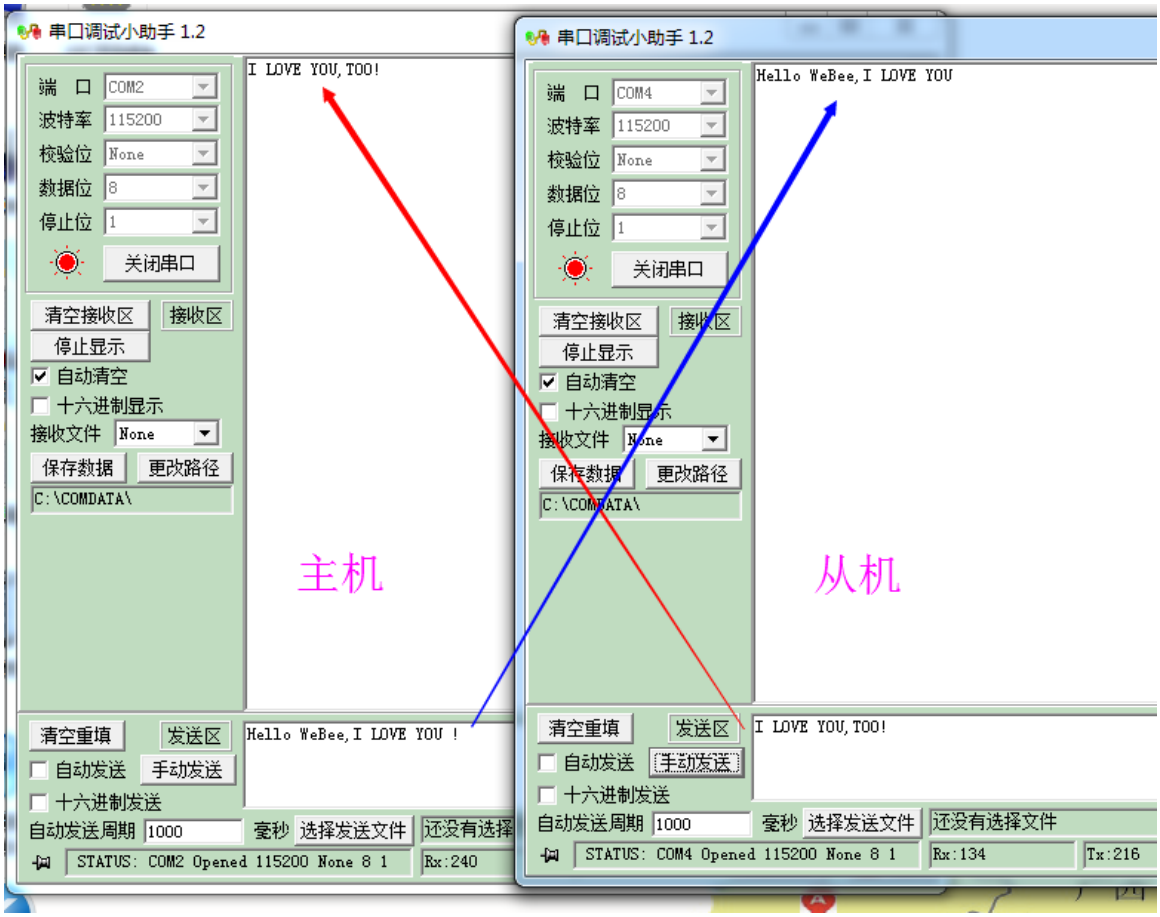
Note: Users can do this by “UART Assistant” software without WeBee software.

8.1 Test the Data Passthrough Between module and module.

Power on the module, When the LED1 is on that means this 2 modules is connected.



Then open the “UART Assistant” software and set the UART number and baud rate. Then this to module can transmit data to each other.



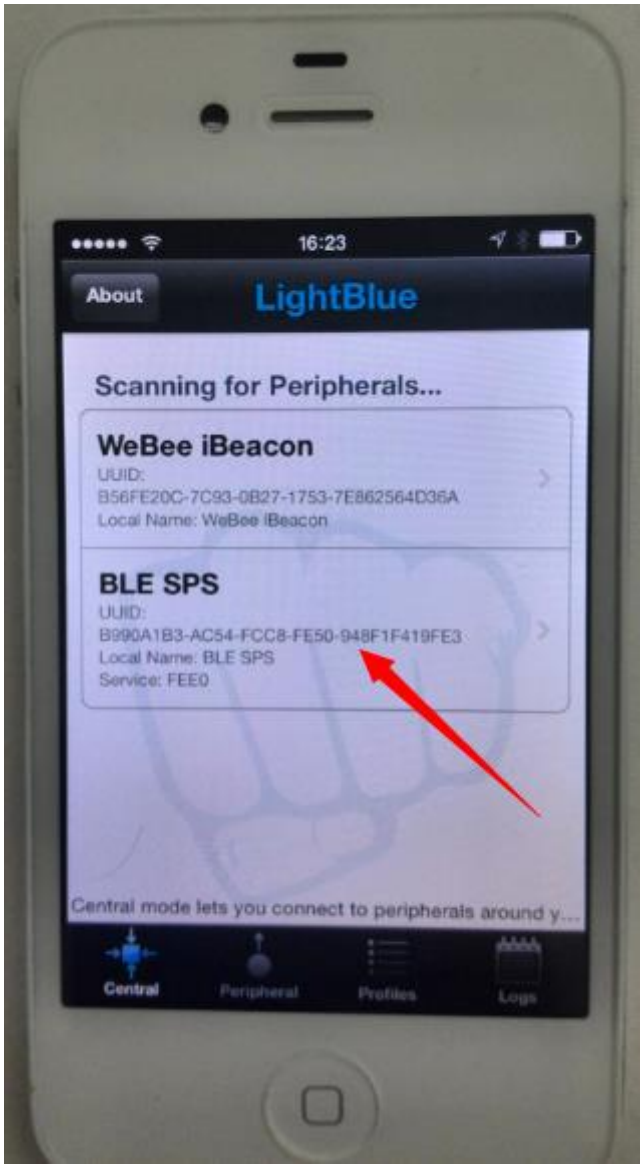
8.2 Test Data Passthrough in Smartphone

The smartphone can only communication with the Peripheral role module.

8.2.1 Use “LightBlue” APP for Testing.

1. Download the ”LightBlue” app in apple app store and install it.

2. Module connects to the PC via USB and Power on it. At this time, the lightblue will found the “BLE SPS” the listed it. As the following shows.

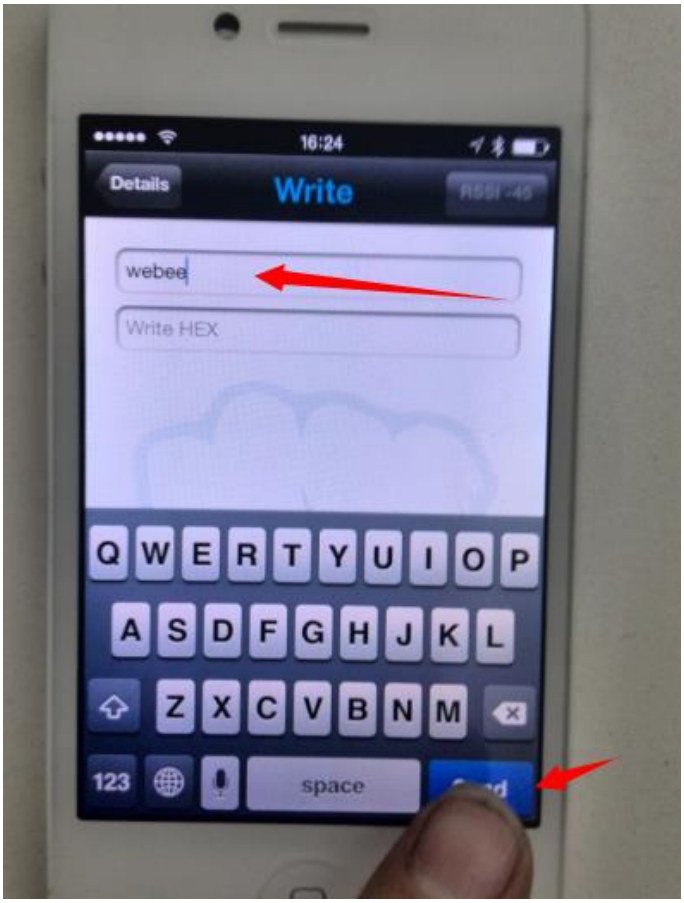


3. Click the “BLE SPS”, the smart phone will connect to the module and the LED1 of the board will be on. The following picture means the connection is built.

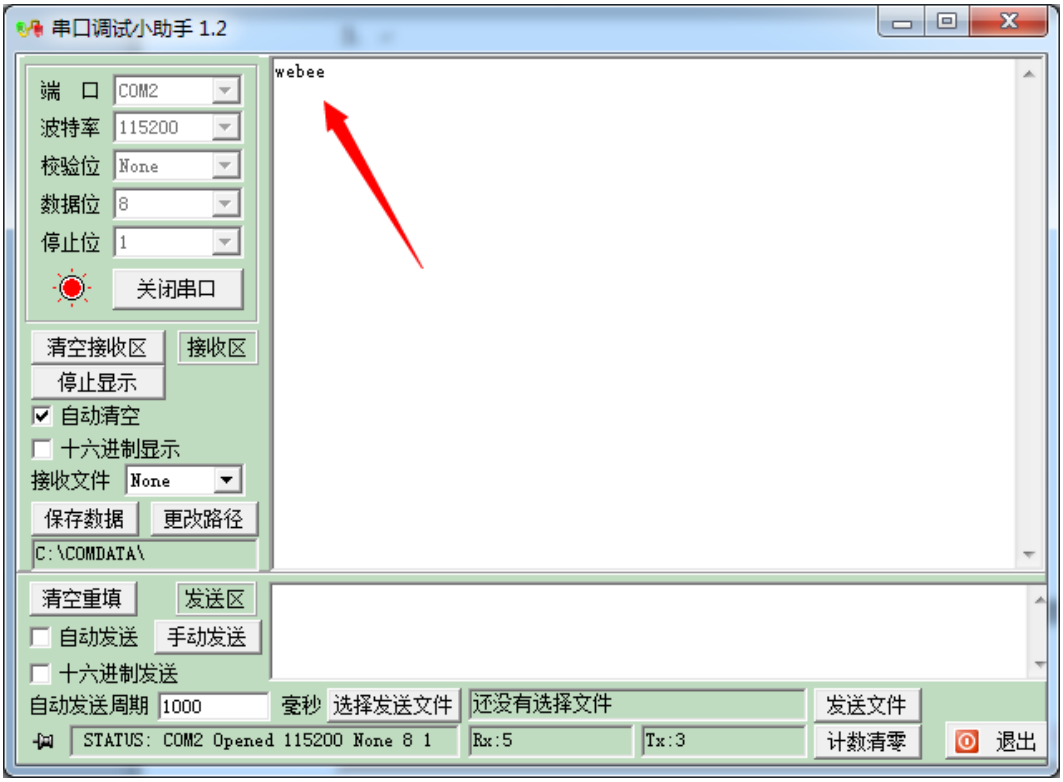
4. Click “ 0xFEE0”, it will show “0xFEE1” and click “0xFEE1”,it will show the following picture:

5. Click “Write” will send the data from smartphone to module.

16:23
Details
Write
RSSI -45
Write ASCII
Write HEX
Central
Peripheral
Profiles
Logs

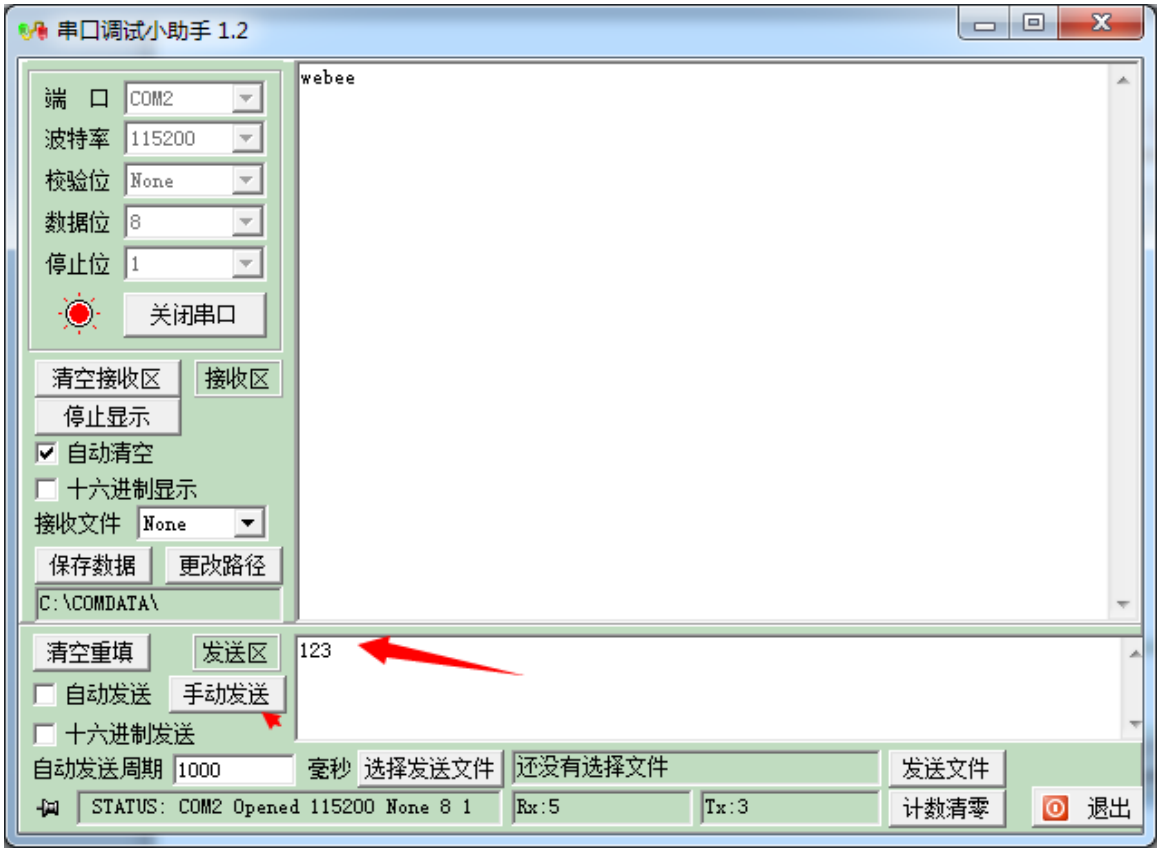

16:24
Details
Write
RSSI -45
webee
Write HEX
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123
space

6. The module gets the data from the smartphone will show in “UART Assistant” software.

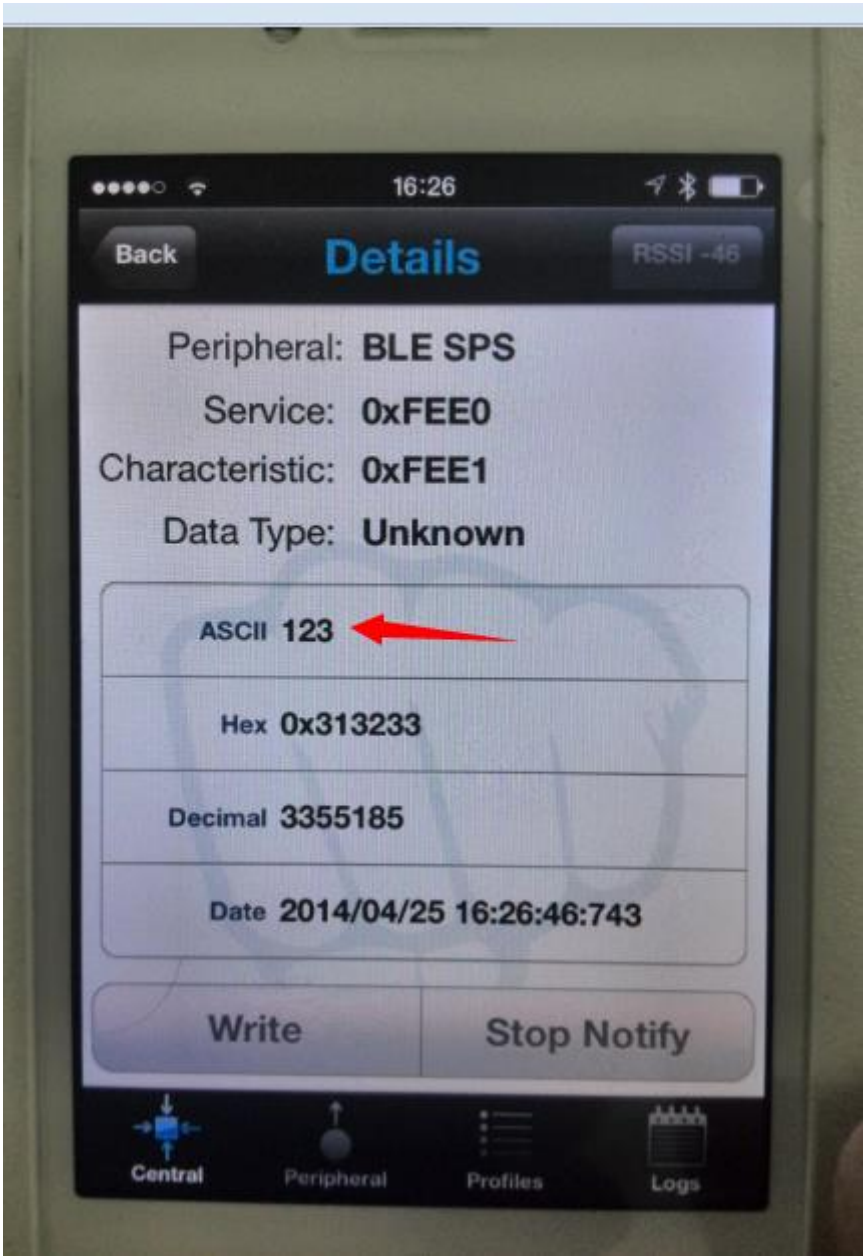


7. Now make the module sends data to smartphone:
   Click “start notify” in the following picture.

8. PC software Sends “123” to Module via UART

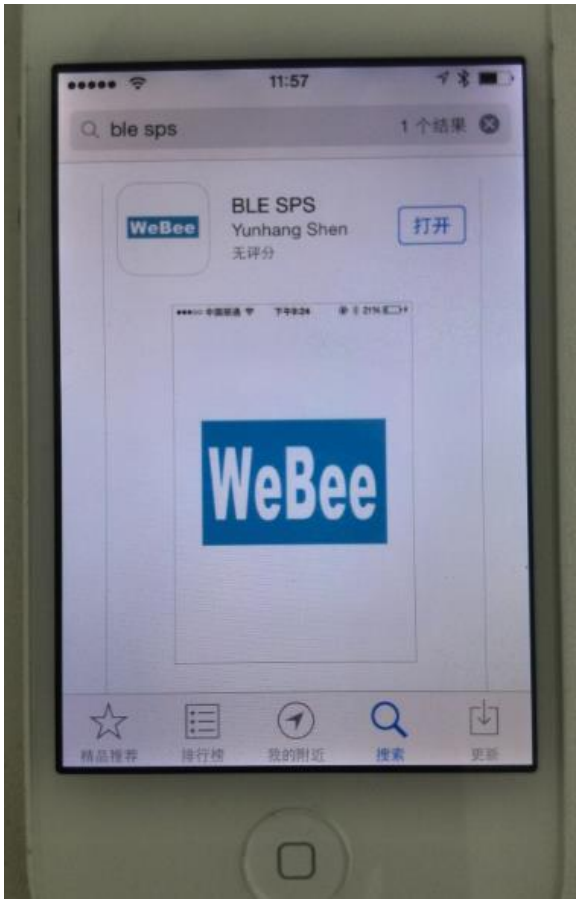


9. The smartphone will get the data “123” from the module. It shows as following:



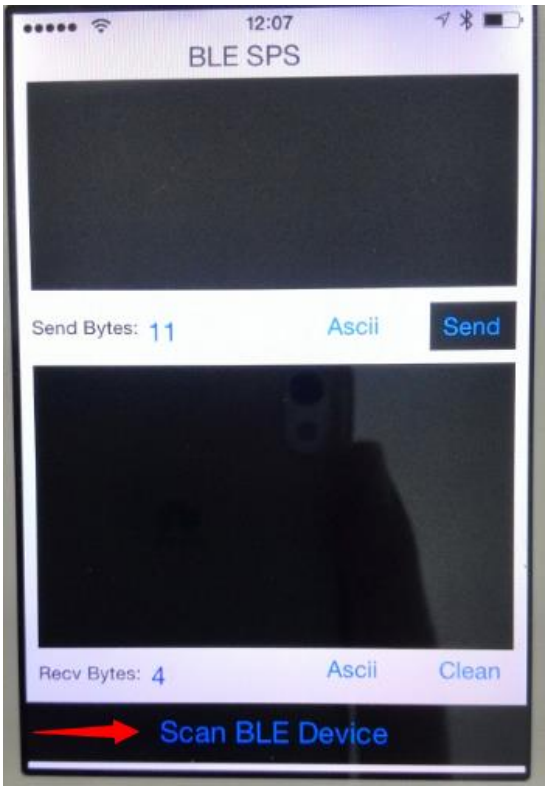
8.2.2 Use the APP testing that WeBee provide(ios7.0 above)

10. Download the ”BLE SPS” app in apple app store and install it.


11:57
ble sps
1 个结果
BLE SPS
Yunhang Shen
无评分
打开
WeBee
WeBee

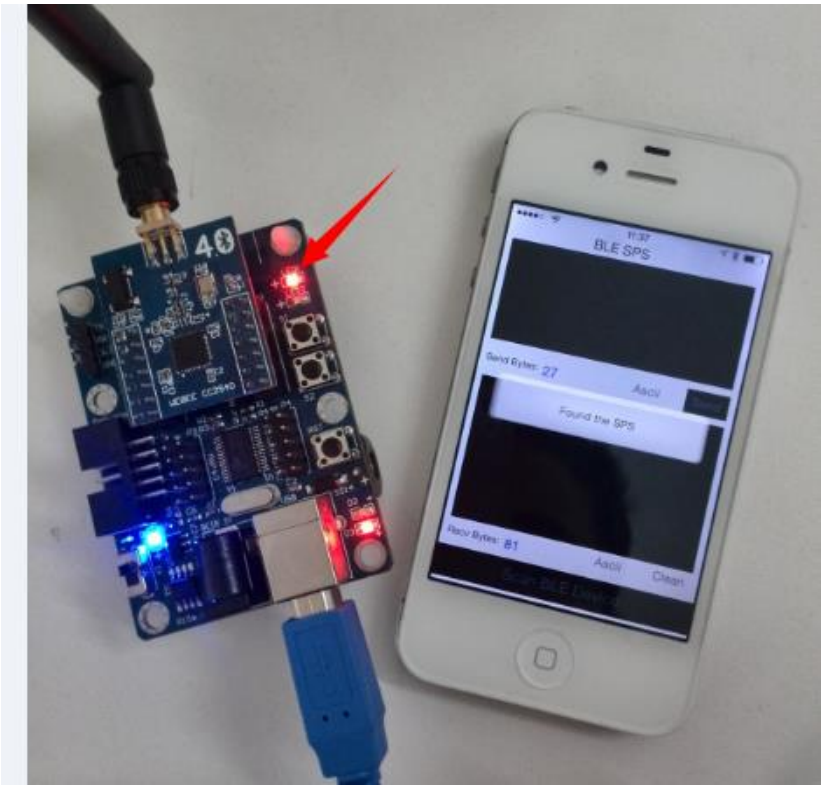
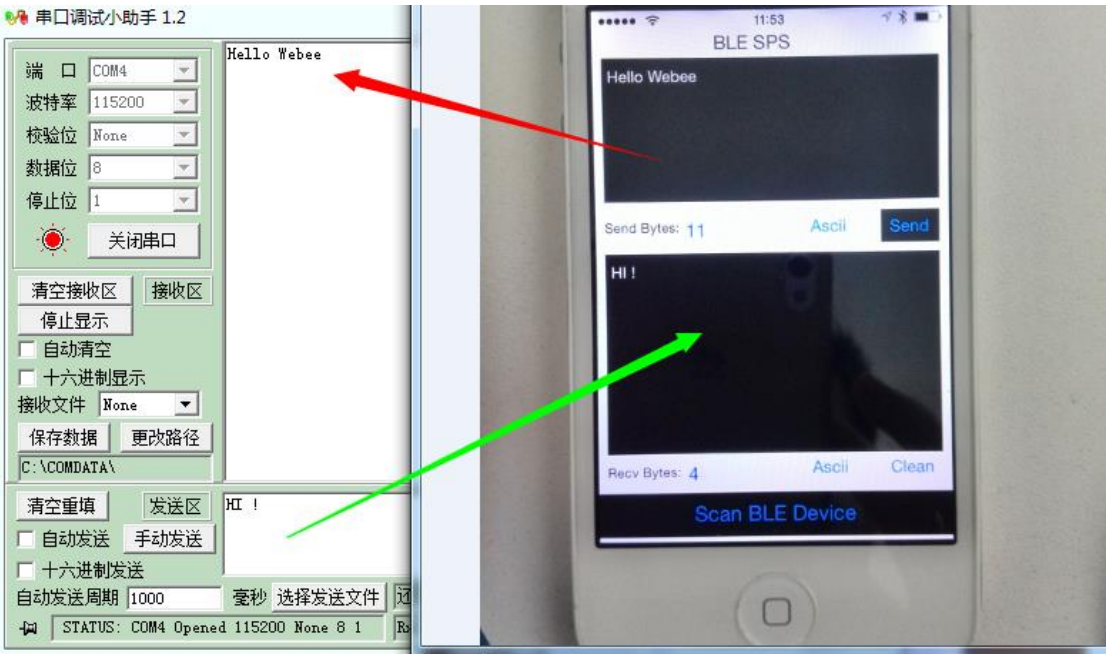
11:57
WeBee
BLE SPS
工具
相机
设置

1. Connect the module to PC via USB. Click “Scan Ble Device”



b

2. The app will list the device, when it has scan the BLE Module, Device name is: “BLE SPS”, Choose “BLE SPS” to be connected.



3. After the connection is built, they can transmit data to each other.